

Anemia among Children Consuming Cow's Milk

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ABSTRACT

Objective: To determine the frequency of iron deficiency anemia among children consuming cow's milk.

Study Design: Descriptive / cross-sectional study.

Place and Duration of Study: This study was conducted at the Pead's Deptt, PGMI, Hayatabad Medical Complex Peshawar from Jan 12, 2016 to July 11, 2016.

Materials and Methods: All children showing history of cow's milk consumption in the last at least 2 months were included in the study through OPD. Sternly exclusion criteria were followed to control confounders and biasness in the study results. Iron Deficiency Anemia (IDA) was stratified among age and gender to see the effect alterations. Post stratification was done through chi-square test keeping p-value ≤ 0.05 as significant. All results were displayed in the form of tables and graphs. Total sample size was 148 with convenience (non-probability) sampling technique.

Results: A total of 148 patients exhibiting history of cow's milk feeding were included in the study. There were 90 (60.81%) males and 58(39.19%) were females. Male to female ratio was 1.61:1. Average age of the patients was 12.26 Months ± 5.77 SD with range 2-24 months. The iron deficiency anemia in patients having history of cow's milk consumption in the last at least two months was present in 54 (36.49%) patients.

Conclusion: There is high ratio of iron deficiency anemia in this part of the world in patients using cow's milk

Key Words: Anemia, Iron Deficiency, cow's milk, Frequency.

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INTRODUCTION

Iron-deficiency anemia (IDA), defined as iron deficiency (serum ferritin $<12 \mu\text{g/L}$) with hemoglobin levels $<110 \text{ g/L}$,^{1,2} can mount a considerable load of disease in paediatrics.¹ Iron deficiency occurs when stored iron's level becomes depleted.² IDA happens if iron quantities are significantly lowered to cause anemia.³ Although children with iron deficit are commonly asymptomatic, Iron-deficiency anemia has been related in certain studies with intellectual and social delays in children.⁴ Inadequate dietary iron, iron absorption and intense exercise, along with blood loss and parasitic infestations, are some etiologies of IDA.⁵ Healthy newborn infants have a total body iron of 250 mg, which is obtained from maternal sources.⁶

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Although historically routine consumption of dairy products had a geographically limited distribution, milk consumption has become widespread among children throughout the globe, a process that has been supported, in part, by promotion of milk in school feeding programs.⁷ Infants consuming cow milk have a greater incidence of iron deficiency, because of low iron content of cow's milk, occult intestinal blood loss associated with cow's milk consumption during infancy and inhibition of non-heme iron absorption by calcium and casein.^{8,9}

Consumption of cow's milk is thought a risk factor for IDA and is advised against fore 12 months of age by the American Academy of Pediatrics, and the Centers for Disease Control and Prevention.¹⁰ In a systematic review, a study was found comparing iron- enriched formula with non-iron-enriched formula and cow's milk and the incidence of IDA was 6% vs 22% vs 43% respectively.¹¹ In another study, the prevalence of anemia among children consuming cow's milk was 45.2%.¹² In a study by Thorisdottir AV et al, the prevalence of iron deficiency was highest in the cow's milk group and lowest in the follow-on formula group.¹³

The present study is designed to determine the frequency of IDA among children consuming cow's milk. Cow's milk consumption is common in our community and involves increased risk of developing IDA. This research will give us with a regional data about the occurrence of IDA in children consuming cow's milk.

MATERIALS AND METHODS

The study was performed after approval from hospitals ethical and research committee. All children with inclusion criteria {history of cow’s milk consumption in the last at least 2 months, Age group (6 months to 02 years), either gender, Quantity (cow’s milk consumption of 16 to 24 ounces per day)} were included in the study through OPD. The aim and benefits of the study was explained to their guardians and a written informed consent was acquired.

All children were subjected to thorough history, followed by complete usual examination. From all the children, a 5cc of venous blood was obtained under strict aseptic practices and were sent to hospital laboratory for quantifying Hb (Hemoglobin) and Ferritin levels. All the investigations were done by same proficient hematologist.

All the above-mentioned statistics including name, age and gender were recorded in a pre-designed proforma. Strictly exclusion criteria (History of intake of iron therapy, blood transfusions & bleeding of any amount, in the last three months) were obeyed to limit confounders and bias in the study conclusions.

SPSS version 20 for windows was used to store and analyze the data. Mean + SD were computed for mathematical variables like age, Hb and Serum ferritin. Frequencies and percentages were calculated for clear-cut variables like gender and IDA. IDA was stratified among age and gender to see the effect variations. Post stratification was done through chi-square test preserving p-value ≤ 0.05 as significant. All results were presented in the form of tables and graphs.

RESULTS

A total of 148 patients presenting with history of cow’s milk intake in the last at least two months were included in the study. Males were 90 (60.81%) and females were 58 (39.19%). Male : Female was 1.61:1. Fig 1.

Patient’s average age was 12.26 months±5.77 SD with range 2-24 months. Patients were distributed age wise into 3 groups, among them frequent age category for displaying history of cow’s milk ingestion was 6-15 months. There were 20 (13.5%) patients of the age ≤ 5 months, 84 (56.8%) patients were in the age span of 6-15 months and 44 (29.7%) were of age more than 16 months.

The iron deficiency anemia in patients having history of cow’s milk feeding was found in 54 (36.49%) patients while 94 (63.51%) patients were found free of iron deficiency anemia. Fig 1

It is clear from data that IDA was present in most of patients having 6-15 months of age; although it was insignificant with p value=0.232. Four (20%) patients with iron deficiency anemia having age ≤ 5 months, age group 6-15 months contains 40% iron deficiency

anemia and patients having more than 10 months of age have 36.4% iron deficiency anemia. Table 1

Table No.1: Age wise distribution of iron deficiency anemia

	Iron Deficiency Anemia		Total	p-value
	Yes	No		
Age in months <= 5.00	4 20.0%	16 80.0%	20 100.0%	0.232
6.00 - 15.00	34 40.5%	50 59.5%	84 100.0%	
16.00+	16 36.4%	28 63.6%	44 100.0%	
Total	54 36.5%	94 63.5%	148 100.0%	

Table No.2: Gender wise distribution of iron deficiency anemia

	Iron deficiency anemia		Total	p-value
	Yes	No		
Male	35 38.9%	55 61.1%	90 100.0%	0.281
Gender Female	19 32.8%	39 67.2%	58 100.0%	
Total	54 36.5%	94 63.5%	148 100.0%	

Table No.3: Descriptive statistics for hemoglobin and ferritin

	N	Min.	Max.	Mean	STD. Deviation
Hemoglobin Level (in gm/dl)	148	8.00	13	12.25	13.68
Ferritin Level (in µg/L)	148	9.50	14.50	13.68	3.99

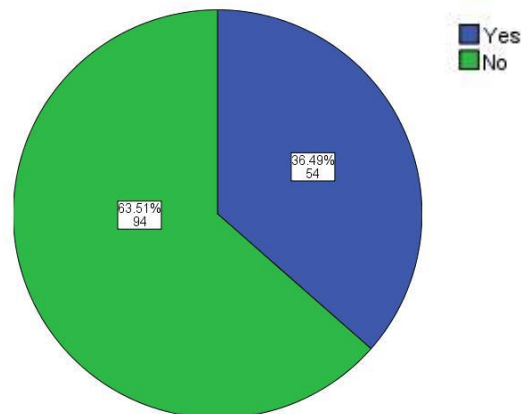


Figure No.1: Iron deficiency anemia in children consuming cow’s milk

Gender wise iron deficiency anemia in patients having history of cow's milk ingestion demonstrates that gender have also no noteworthy role over them with p -value=0.281. There were 38.9% iron deficiency anemia in male and 32.8% observed in female patients. Table 2 Average hemoglobin level was 12.25 gm/dl +4.75 SD while average ferritin level was observed as 13.68 μ g/L+3.99 SD. Table 3.

DISCUSSION

During gestation most of females became anemic in both developed & developing nations.

WHO reports that in developing countries from 35% to 75% (avg: 56%) & in developed countries 18% of females develop anemia in gestation.¹⁴ Iron deficiency is more prevalent than anemia and iron deficiency usually occurs in late stages of gestation even in females who become pregnant with comparatively satisfactory iron Depots.¹⁵

In USA, percentage of anemia have declined from twenty percent to thirty percent of children < 1 year in the 1960s and 1970s to < five percent by the mid-1980s.^{16,17} This declination in IDA incidence is due to improved iron fortified formulas, prolong period of breastfeeding, the abstention of cow's milk in infancy, and subsidized nutrition programs by government.¹⁶⁻¹⁹ the American Academy of Pediatrics (AAP) has already pointed out in 1960s, the possibility of deficiency of iron in children <1 year of age & advised a least amount of iron per day.²⁰ In infancy, anemia due to use of cow milk is also proved from early studies.^{21,22} This compelled the Committee for the usage of iron fortified formulas and cereals.²³

Changing research and recommendations have led to the present AAP strategy that cow's milk should not be used during infancy instead of breastfeeding, iron-fortified formula and beginning at the age of six months, iron fortified cereals & formulas.²³⁻²⁴

An inverse relation has been well recognized between the use of cow's milk & iron status during first 12 months of life and later in childhood.^{20,21,25-34} In toddlers, too much cow's milk use is a frequent risk factor for severe anemia.³⁵

Cow's milk contains low quantity of iron. A 240 mL of cow's milk has 0.07 mg of iron, which is merely one percent of the recommended iron per day.^{36,37} This amount of milk has 146 calories.³⁸ Majority of contributors advise 720 mL/day of milk. Toddlers dependent on milk for a large portion of their food; use a significant %age of their regular calories from low iron containing diet & so loss chances to use iron rich foods.³⁹

CONCLUSION

Iron deficiency and IDA remain to be major health issues in children. There is high proportion of iron deficiency anemia noticed in this study in patients using

cow's milk. It should be taken as serious issue. Enquiry should be done on each well-child visit about the quantity of cow's milk used & the age at which it was started. This will allow the contributor to consider additional assessment for likely iron deficiency, IDA & to encourage counseling about infant nutrition.

Author's Contribution:

Concept & Design of Study: Sami ul Haq
 Drafting: Niamat Ullah
 Data Analysis: Hazrat Bilal Khan
 Revisiting Critically: Sami ul Haq, Niamat Ullah
 Final Approval of version: Sami ul Haq

Conflict of Interest: The study has no conflict of interest to declare by any author.

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